

Musculoskeletal oncology: patient triage and management during the COVID-19 pandemic

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ABSTRACT

Sarcoma treatment during the COVID-19 pandemic is a new challenge. This patient population is often immunocompromised and potentially more susceptible to viral complications.

Government guidelines highlight the need to minimize patient exposure to unnecessary hospital visits. However, those guidelines lack practical recommendations on ways to manage triage and diagnosis expressly for new cancer patients. Furthermore, there are no reports on the efficiency of the guidelines.

One of the main issues in treating musculoskeletal tumours is the complexity and variability of presentation. We offer a triage model, used in a quaternary-referral musculoskeletal oncology centre, that allows us to maintain an open pathway for referral of new patients while minimizing exposure risks. A multidisciplinary approach and analysis of existing investigations allow for a pre-clinic evaluation.

The model identifies 3 groups of patients:

- Patients with suspected high-grade malignancy, or benign cases with aggressive features, both in need of further evaluation in the clinic and prompt treatment
- Patients with low-grade malignancy, and benign cases whose treatment is not urgent, that are managed during the pandemic by telemedicine, with reassurance and information about their illness
- Patients who can be managed by their local medical professionals

In comparison to a pre-pandemic period, that approach resulted in a higher ratio of malignant-to-benign conditions for new patients seen in the clinic (3:4 vs. 1:3 respectively), thus using available resources more efficiently and prioritizing patients with suspected high-grade malignancy.

We believe that this triage system could be applied in other surgical oncology fields during a pandemic.

Key Words Sarcoma, orthopedic oncology, musculoskeletal tumours, COVID-19 pandemic

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INTRODUCTION

The respiratory illness COVID-19, caused by coronavirus SARS-CoV-2, was first detected during December 2019 in Wuhan, China, and has since spread rapidly across the globe¹. On 11 March 2020, the disease was declared a pandemic by the World Health Organization. Since then, extreme measures have been taken to prevent the spread of the disease by ensuring physical distancing. The medical system has thus been faced with unprecedented challenges related to shortages of medical staff and equipment, and has had to minimize elective treatment, leading to impairment in the treatment of patients not having COVID-19².

Cancer treatment during the current pandemic is further challenged by the potential susceptibility of patients to the virus, because they are often immunocompromised, particularly during or after chemotherapy and surgery. Emerging data suggest worst outcomes for patients with cancer who also have COVID-19³, although those data are limited and should be viewed with caution⁴.

Recently, government guidelines have highlighted the need for minimizing patient exposure to unnecessary hospital visits^{5,6}. However, those guidelines lack practical recommendations for ways to manage triage and diagnosis expressly for new cancer patients. Furthermore, there are no reports about the efficiency of the guidelines.

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Sarcomas are mesenchymal tumours that constitute about 1% of malignant tumours in adults. They are a highly heterogeneous group: the World Health Organization classification reports more than 90 benign tumour types and 80 malignant types having different clinical courses, pathology characteristics, and treatment⁷. Multidisciplinary management in a specialized centre both for diagnosis and treatment is a core principle for sarcoma management. The “gold standard” treatments are, for soft-tissue sarcomas, complete surgical excision with neoadjuvant or adjuvant radiotherapy, and for bone sarcomas, neoadjuvant and adjuvant chemotherapy with wide excision^{8,9}.

Quebec is the province most affected by the pandemic in Canada, and our medical centre was greatly affected because it is located in the most affected region of the province¹⁰. The resulting challenges encouraged the multidisciplinary musculoskeletal team to develop efficient and innovative ways of managing new cases during these unprecedented times. Here, we present a triage model that we developed for our quaternary-referral musculoskeletal oncology centre, and we share its implementation in our clinic between 17 March and 8 May 2020 during the COVID-19 pandemic.

METHODS

As the outbreak began, these goals were set to guide our outpatient service:

- Maintain an open channel for referral of new patients.
- Conduct new investigations for suspected malignant tumours, while avoiding unnecessary investigations for benign or aggressive benign tumours.
- Continue adequate post-surgery and long-term follow-ups, while minimizing outpatient clinic visits.
- Minimize exposure risk for patients and staff.

Accordingly, the approach described in Figure 1 was taken.

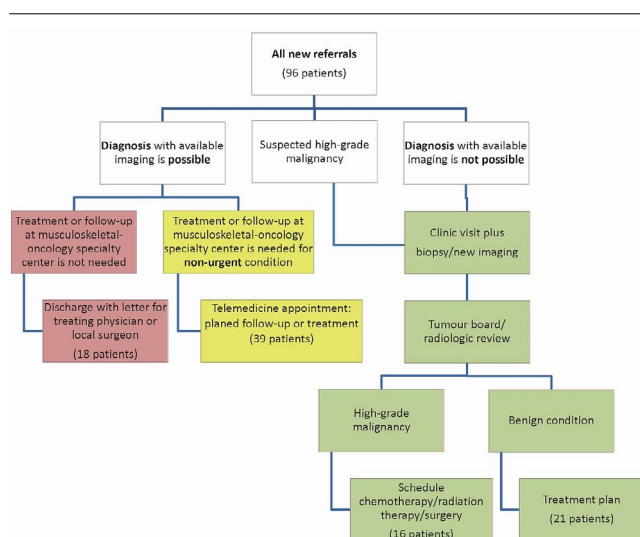


FIGURE 1 Flow chart depicting evaluation and management for new referrals in a musculoskeletal oncology clinic from 17 March to 8 May 2020, during the COVID-19 pandemic.

A direct and fast referral method—by e-mail, fax, or telephone—for consultations by our musculoskeletal oncology group was available through our clinical coordinator. The clinical coordinator was responsible for downloading all available imaging studies to our system. In Quebec, an electronic health record contains all medical and almost all radiology information about an individual patient. All hospital-based radiology departments and most private radiology clinics are now linked into that system. All new referrals were screened daily by an orthopedic oncology specialist who reviewed the relevant background history and imaging studies. When required, imaging studies were reviewed by a specialized musculoskeletal radiologist.

For conditions that could be diagnosed based on the available imaging studies and tests:

- When further treatment in a musculoskeletal oncology specialty centre was not required, this approach was taken:
 - For benign conditions not requiring further treatment, a discharge consultation letter was sent back to the referring physician with pertinent information and guidelines about the patient’s condition.
 - For benign or malignant conditions requiring further treatment, contact was made with a local surgeon with instructions for recommended treatment.
- When further treatment in a musculoskeletal oncology specialty centre was required, this approach was taken:
 - For benign or low-grade tumours, the patient was counselled and reassured in a telephone appointment. Plans for future evaluation and treatment were discussed as needed.
 - In cases of suspected malignancy or an unclear diagnosis, the cases were presented in a tumour board meeting held by video conference with a musculoskeletal radiologist, a pathologist, a medical oncologist, orthopedic oncologists, and surgical oncologists in attendance. When a tissue diagnosis was required, a biopsy was planned and scheduled, either in the clinic by an orthopedic oncologist specialist or under imaging guidance by a specialized radiologist. Patients were summoned, and all necessary additional inquiries and biopsies were set to be held on a single day so as to minimize the number of hospital visits. Pathology results and imaging were reviewed by the tumour board, and treatment plans were determined accordingly.

Table 1 presents the distribution of malignant and benign conditions.

Routine follow-ups were managed primarily by telemedicine or telephone appointment. Before the appointment, new imaging studies performed outside our hospital were downloaded to our system and reviewed by the senior physician. Immediate postoperative follow-ups were seen in the clinic for wound evaluation.

To minimize the risk of simultaneous exposure of senior staff members, clinic times were split and only 1 senior staff member attended each session.

TABLE I Distribution of benign and malignant conditions

Tumour type	Cases [n (%)]
<i>Benign conditions</i>	
Lipomatous	18 (26.1)
Nerve sheath	3 (4.3)
Synovial	15 (21.7)
Chondroid	6 (8.7)
Vascular	5 (7.2)
Bone lesions	11 (15.9)
Other	11 (15.9)
TOTAL	69
<i>Malignant conditions</i>	
Low-grade sarcomas	8 (29.6)
High-grade sarcomas	8 (29.6)
Bone metastasis	7 (25.9)
Hematologic diseases	3 (11.1)
Skin cancer	1 (3.7)
TOTAL	27

RESULTS

During the period between 17 March and 8 May 2020, 155 follow-ups and 96 new referrals [27 new malignancies (28%), 69 new benign conditions (72%)] received services. Figure 2 presents the distribution of the patients screened.

In a similar period pre-pandemic (8 January to 28 February 2020), 112 new referrals were screened, of which 24 (21%) represented a patient with a malignant condition. When comparing new clinic visits, a malignant condition was the cause in 16 of 37 visits (43%) during the pandemic and in 24 of 93 visits (26%) during the pre-pandemic period. The ratio of malignant to benign conditions was thus higher among new patients seen in the clinic during the pandemic (3:4) compared with pre-pandemic (1:3). Those data reflect the efficient redirection of resources toward prioritizing malignant cases.

DISCUSSION

The current times are unprecedented, and although minimizing exposure is necessary, the quality of treatment given to cancer patients must not be jeopardized. The triage system we present takes a multidisciplinary approach, with analysis of existing investigations, providing a pre-clinic evaluation system for a diversity of diagnoses. That approach allows for prioritization of suspected high-grade malignancies or benign lesions with aggressive features and risk of fracture or neurovascular compression. Its effectiveness is demonstrated by an increase in the ratio of malignant-to-benign conditions in new patients seen at the clinic during the pandemic, to 3:4 from 1:3 pre-pandemic, despite a similar referral burden. A key factor in the approach is identifying low-grade malignancies and benign conditions that can be treated by local medical professionals or for which treatment is not urgent. During a pandemic, the latter patients can be managed without a clinic visit, while still properly reassuring them and informing them about their illness.

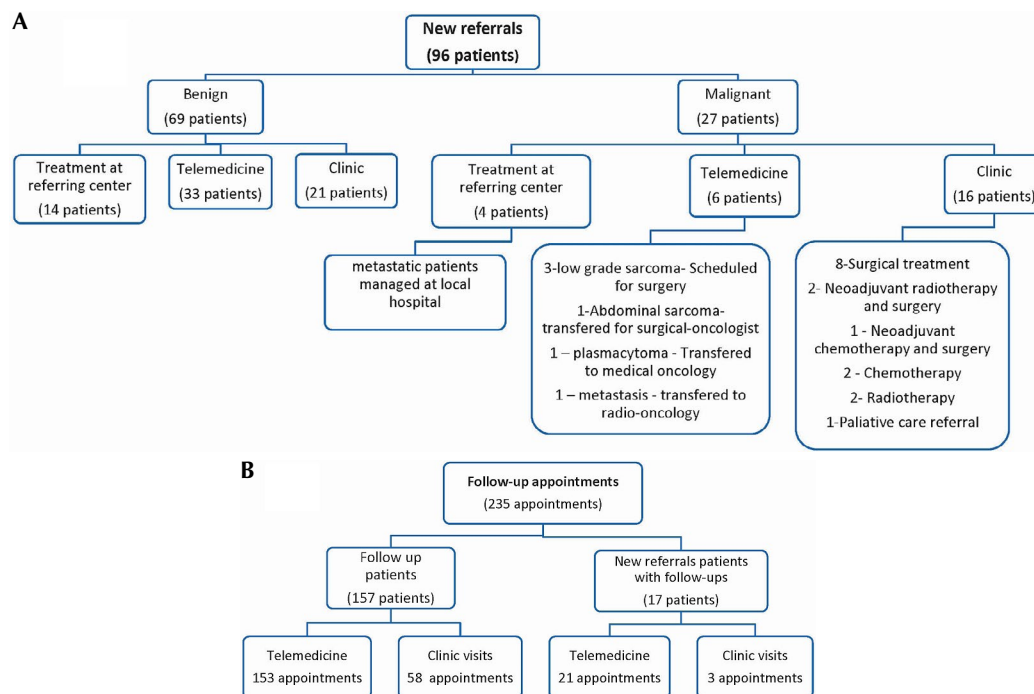


FIGURE 2 Flow charts depicting screening distribution for patients in a musculoskeletal oncology clinic from 17 March to 8 May 2020, during the COVID-19 pandemic. (A) New referrals. (B) Follow-up appointments.

CONCLUSIONS

Managing patients with cancer during the COVID-19 pandemic creates many challenges. Making sure that every patient is treated according to his or her individual needs demands rethinking and optimization of everyday routines. Obtaining diagnoses promptly, and managing and treating new patients efficiently are steps crucial for minimizing the impact of the pandemic on this already high-risk group. A triage protocol with a pre-clinic evaluation and reorientation system is an effective way to maintain an open pathway for new referrals with a malignancy. Although patients with musculoskeletal tumour are a distinct group, we believe that our systematic triage system could be applied in other fields of surgical oncology.

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CONFLICT OF INTEREST DISCLOSURES

We have read and understood *Current Oncology's* policy on disclosing conflicts of interest, and we declare that we have none.

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